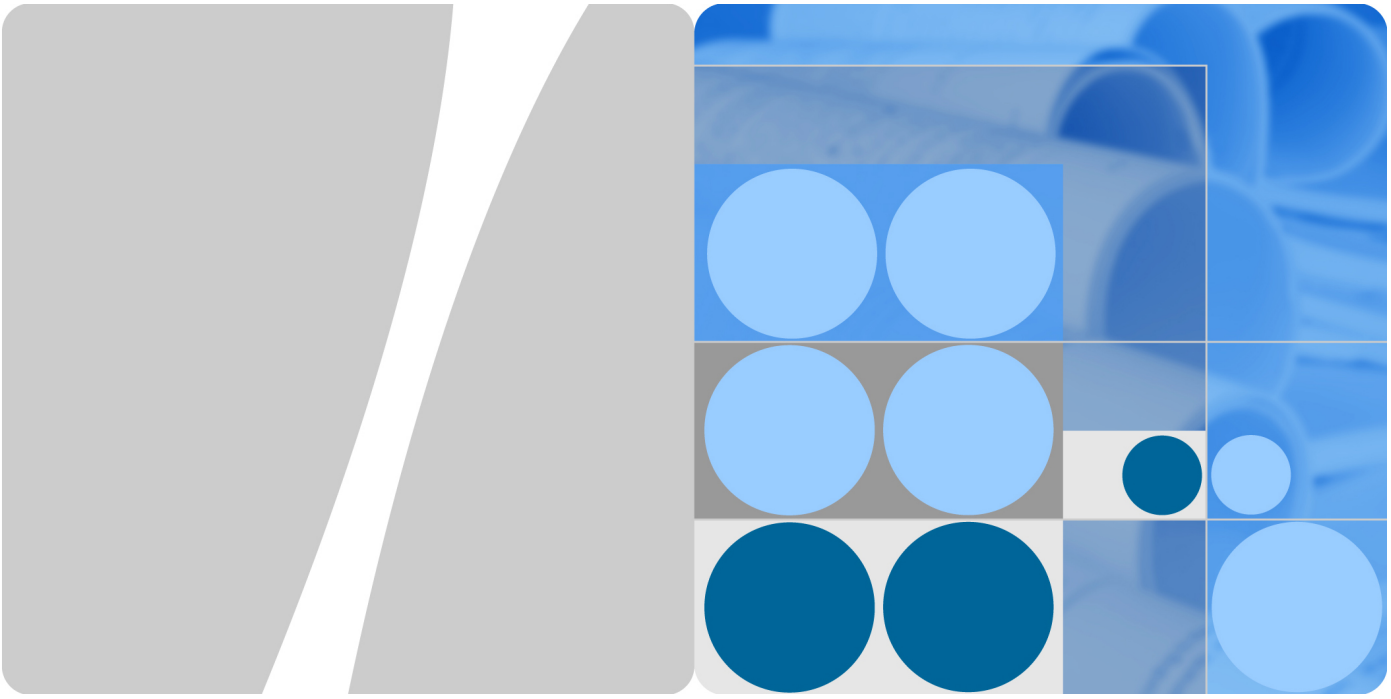

GSM-R 6.0 DBS3900
Product Description

Issue V1.0

Date 2011-06-16

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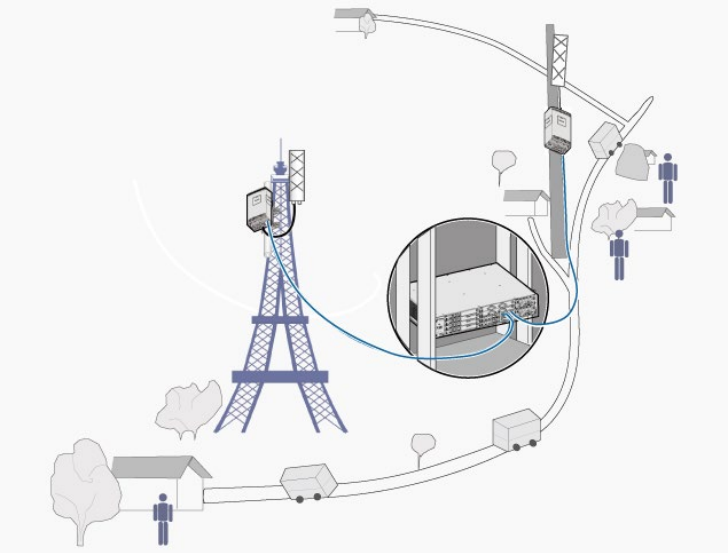
1 Introduction

1.1 Positioning

Customer-oriented and innovative, Huawei spares no effort in developing the distributed base stations and pioneers cutting-edge techniques in the field. The industry-leading distributed base station — DBS3900 GSM-R (hereafter referred to as DBS3900) — developed by Huawei aims at constructing future-oriented networks for operators. With only two basic functional modules, the DBS3900 features a compact structure, high integration, low power consumption, and enables easy installation and fast deployment.

Figure 1-1 shows the GSM-R application of the DBS3900.

Figure 1-1 GSM-R application of the DBS3900



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1.2 Benefits

Simple Structure and Fast Network Deployment

The DBS3900 has only two types of basic functional modules, thus greatly reducing the investment in spare parts and maintenance. With excellent environment adaptability, basic modules can be easily adapted to onsite conditions to achieve efficient deployment, obviating an equipment room. That is, there is no additional cost of construction an equipment room.

Flexible Installation and Particularly Well-Suited to Railway Coverage

The remote radio module provides the following benefits:

- Since the RF module of the DBS3900 can be mounted on top of the tower, the feeder length is significantly reduced and the cost of procuring feeders is decreased accordingly.
- Moreover, the decrease in feeder loss results in a power gain increase of 3 dB to 5 dB and improvement in the coverage radius by over 20%. Thus, the coverage capability of the traditional macro BTS can be achieved at a lower Top-of-Cabinet transmit power (TOC).
- Thanks to the radio remote technology, the DBS3900 supports distributed installation of baseband and RF modules, which provides great flexibility to design the coverage along railway lines.

Cell Expansion with Multi-RRU, Multi-Site Cell Feature

Thanks to the distributed design, all the RRUs controlled by one BBU can be configured with the same frequency and installed at different locations along railways. The whole DBS, such as the BBU and all the RRUs connected to it, belongs to one single cell. The most significant advantage of such a scheme is to reduce the amount of inter-cell handovers. Compared with the repeater, each RRU can produce and manage the radio signal independently, noise is not amplified by the succession of passive lossy devices, and the DBS can be managed in its entirety (BBU and all its RRUs) by a unified maintenance interface.

Protection Against BBU Failure: Single Frequency Double Coverage Feature

The single frequency double coverage scheme enables two BTSs working in active/standby mode to cover the same area. In addition, only one of the BTSs is working at any specific time. The two BTSs use exactly the same frequencies. In normal cases, the active BTS works properly, whereas the standby BTS works but does not transmit power. When the active BTS is faulty, the BSC triggers the switchover between the active BTS and the standby BTS. Specifically, the previously active BTS is downgraded to "standby BTS" status, whereas the previously standby BTS is upgraded to "active BTS" status. This redundant coverage does not require any additional frequencies compared to single coverage, thus improving network availability and ensuring continued network operation even in the case of a BTS failure.

Protection Against BBU Failure: BBU Redundancy Feature

The RRUs are connected to both the active and the standby BBU. That is, each RRU is connected to two BBUs. Under normal circumstances, the RRU communicates with only the active BBU. Under normal circumstances, the RRU communicates with only the active BBU.

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With the BBU Redundancy feature, the RRU supports automatic switchover of CPRI ports in case of BBU failure. When a failure occurs on the active BBU, the BSC switches over the active and standby BBUs so that the standby BBU becomes active. The RRUs, in turn, trigger the CPRI port switchover. After the CPRI port switchover, the RRUs communicate with the newly active BBU.

Low Power Consumption and Energy Efficiency Savings

Thanks to advanced hardware designs, for example, multi-carrier PA, as well as a whole set of software power saving features such as intelligent PA management, the power consumption of the DBS3900 is greatly reduced, which makes it possible for the BTS to be powered by green energy such as the solar power, wind power, and biogas. Meanwhile its natural heat dissipation design enables the RF module to operate without fans, which helps further reduce power consumption without generating noise or fan-related faults. All these features are conducive to the construction of environmentally-friendly networks for operators.

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2 Architecture

2.1 General

Based on the advanced concept of distributed installation, the DBS3900 adopts a modular design, in which there are only two types of basic functional modules: the Baseband Control Unit BBU3910 and the Remote Radio Unit (RRU). The BBU3910 and the RRU are connected through CPRI ports and optical cables linking CPRI ports for signal transmission, realizing the distributed installation for modules.

Different from the centralized installation mode favored by the traditional BTS, the DBS3900 has ushers in a new installation mode under which the locations of the functional modules are no longer limited to slots inside the main cabinet. Thanks to this installation flexibility, the DBS3900 can address the railway operators' requirement of fast site acquisition and network construction.

2.2 BBU3910

The BBU3910, a baseband control unit, is responsible for managing the interaction between the BTS and the BSC. The BBU3910's main functions are as follows:

- Manages the traffic and signaling interface between the BTS and the BSC.
- Provides clock synchronization/generation.
- Manages the entire BTS system in terms of Operation and Maintenance (OM) and signaling processing.
- Provides an OM channel connected to the LMT (or U2020).

2.2.1 Appearance of the BBU3910

With a compact case structure, the BBU3910 occupies a 19-inch-wide and 2-U-high space. It can be installed on a wall, on stairs, or in a storeroom. It can also be installed in the cabinet of the existing network equipment. Figure 2-1 shows the appearance of the BBU3910.

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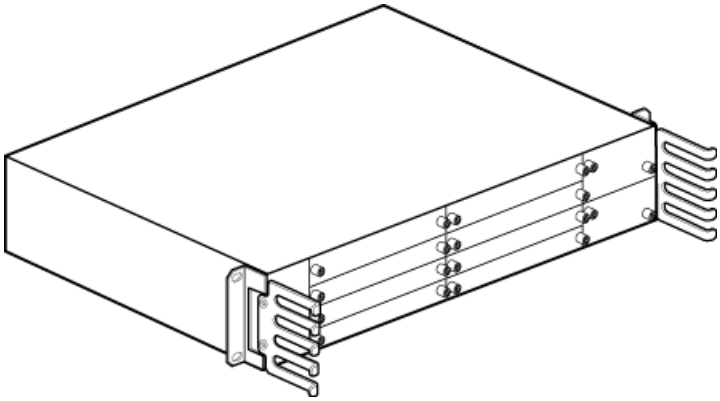
Figure 2-1 Appearance of the BBU3910



The following boards and modules are mandatory for the BBU3910:

- GTMU: main control board
- UBFA: FAN unit
- UPEU: power module

The following boards and module are optional for the BBU3910:

- USCU: Universal Satellite Card and Clock Unit
- UEIU: Universal Environment Interface Unit

2.2.2 Boards of BBU3910

The BBU3910 can be configured with the following boards and units:

- Main control and transmission board: GSM Transmission & Timing & Management Unit for BBU (GTMU)
- Universal Satellite card and Clock Unit (USCU)
- Surge protection unit: Universal E1/T1 Lightning Protection unit (UELP), Universal FE Lightning Protection unit (UFLP), or Universal Signal Lightning Protection unit 2 (USLP2)
- Universal Power and Environment Interface Unit (UPEU)
- Universal Environment Interface Unit (UEIU)
- FAN unit

BBU3910 boards support plug-and-play, and users can configure the boards as required.

2.2.3 GTMU

The GTMU is the main control and transmission board for the GSM network. The type of GTMU is GTMUc.

Panel

Figure 2-2 shows the GTMUc panel.

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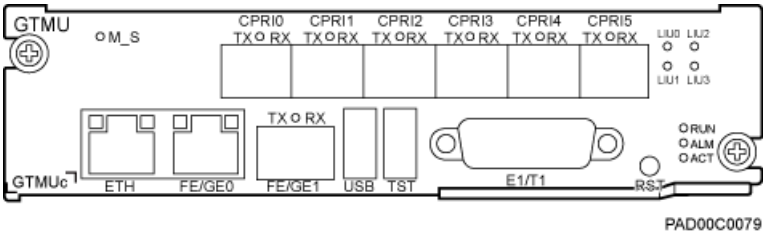
Figure 2-2 GTMUc panel



Functions

The GTMU performs the following functions:

- Controls and manages the entire base station in terms of configuration, equipment, performance, security, and radio resources.
- Processes signaling messages.
- Provides a reference clock, an alarm input port, CPRI ports, transmission ports, and an OM channel to the LMT, SMT, or U2020.

Ports

Table 2-1 describes the ports on the GTMUc.

Table 2-1 Ports on the GTMUc

Identifier	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with the RF modules. These ports support electrical and optical signal input and output.
ETH	RJ45	1	Local maintenance and debug port
FE0	RJ45	1	FE electrical port
FE1	DLC	1	FE optical port
USB	USB	1	Software loading port
TST	USB	1	Clock test port
E1/T1	DB26 female	1	E1/T1 port supporting four E1/T1s

2.2.4 UELP

The UELP is a surge protection unit.

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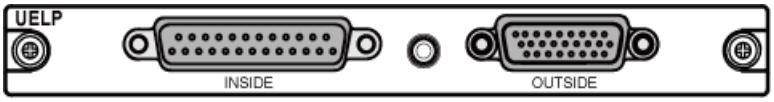
Panel

Figure 2-3 shows the UELP panel.

Figure 2-3 UELP panel



Functions

One UELP can provide surge protection for four E1/T1s.

Ports

Table 2-2 describes the ports on the UELP.

Table 2-2 Ports on the UELP

Identifier	Connector	Quantity	Description
INSIDE	DB25	1	Connects to a transmission board of the base station
OUTSIDE	DB26	1	Connects to an external transmission device

2.2.5 UFLP

There are two types of UFLP: UFLP and UFLPb. The UFLP provides surge protection for FEs. The UFLPb provides surge protection for FEs/GEs.

Panel

Figure 2-4 shows the UFLP panel.

Figure 2-4 UFLP panel

Figure 2-5 shows the UFLPb panel.

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Figure 2-5 UFLPb panel

Functions

The UFLP provides surge protection for two FEs.

The UFLPb provides surge protection for two FEs/GEs.

Ports

Table 2-3 describes the ports on the UFLP.

Table 2-3 Ports on the UFLP

Identifier		Connector	Quantity	Description
INSIDE	FE0 and FE1	RJ45	2	Connects to a transmission board of the base station
OUTSIDE	FE0 and FE1	RJ45	2	Connects to an external transmission device

Table 2-4 describes the ports on the UFLPb.

Table 2-4 Ports on the UFLPb

Identifier		Connector	Quantity	Description
INSIDE	FE/GE0 and FE/GE1	RJ45	2	Connects to a transmission board of the base station
OUTSIDE	FE/GE0 and FE/GE1	RJ45	2	Connects to an external transmission device

2.2.6 USLP2

The USLP2 is available as of SRAN3.0.

Panel

Figure 2-6 shows the USLP2 panel.

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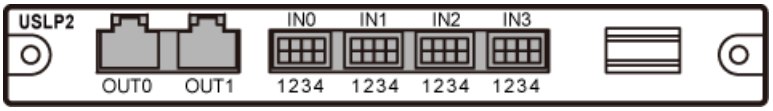
Figure 2-6 USLP2 panel



Functions

The USLP2 provides surge protection for monitoring signals.

Ports

Table 2-5 describes the ports on the USLP2.

Table 2-5 Ports on the USLP2

Identifier	Connector	Quantity	Description
IN0, IN1, IN2, and IN3	4-pin	4	Input ports, which connect to customized alarm devices
OUT0 and OUT1	RJ45	2	Output ports, which connect to EXT-ALM ports of the UPEU or UEIU in the cabinet

2.2.7 UPEU

The UPEU is a power module for the BBU3910. There are three types of UPEU: UPEUa, UPEUb, and UPEUc.

Panel

Figure 2-7 shows the UPEUa panel.

Figure 2-7 UPEUa panel

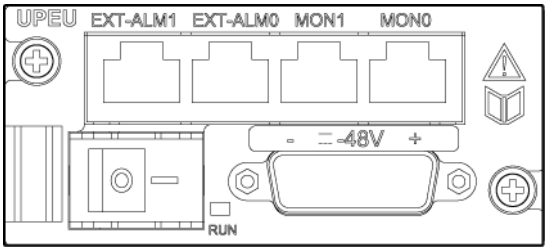


Figure 2-8 shows the UPEUb panel.

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Figure 2-8 UPEUb panel

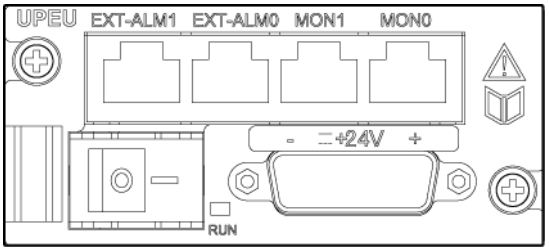
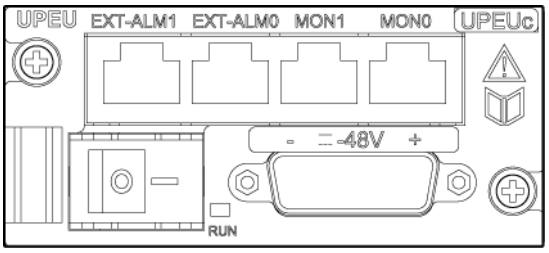


Figure 2-9 shows the UPEUc panel.

Figure 2-9 UPEUc panel



Functions

The UPEU performs the following functions:

- Provides two ports with each transmitting one RS485 signal and two ports with each transmitting four Boolean signals. The Boolean signals can only be dry contact or open collector (OC) signals.
- The UPEUa converts -48 V DC input power into +12 V DC and provides an output power of 300 W.
- The UPEUb converts +24 V DC input power into +12 V DC.
- The UPEUc converts -48 V DC input power into +12 V DC. A UPEUc provides an output power of 360 W. Two UPEUc boards provide a combined output power of 650 W.

Ports

The ports on the UPEUa, UPEUb, and UPEUc are the same. Table 2-6 describes the ports on the UPEUa/UPEUb/UPEUc.

Table 2-6 Ports on the UPEUa/UPEUb/UPEUc

Identifier	Connector	Quantity	Description
UPEUa/UPEUc: -48V	3V3	1	Port for +24 V or -48 V DC power input
UPEUb: +24V			
EXT-ALM0	RJ45	1	Port for Boolean inputs 0 to 3

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EXT-ALM1	RJ45	1	Port for Boolean inputs 4 to 7
MON0	RJ45	1	Port for RS485 input 0
MON1	RJ45	1	Port for RS485 input 1

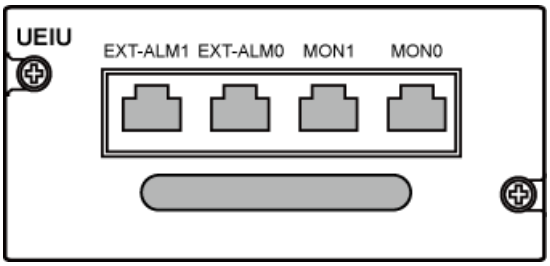
2.2.8 UEIU

The UEIU transmits information reported by the environment monitoring device and alarm information to the main control board.

Panel

Figure 2-10 shows the UEIU panel.

Figure 2-10 UEIU panel



Functions

The UEIU performs the following functions:

- Provides two ports, each transmitting one RS485 signal.
- Provides two ports, each transmitting four Boolean signals, which can only be dry contact or OC signals.
- Transmits information reported by the environment monitoring device and alarm information to the main control board.

Ports

Table 2-7 describes the ports on the UEIU.

Table 2-7 Ports on the UEIU

Identifier	Connector	Quantity	Description
EXT-ALM0	RJ45	1	Port for Boolean inputs 0 to 3
EXT-ALM1	RJ45	1	Port for Boolean inputs 4 to 7
MON0	RJ45	1	Port for RS485 input 0

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MON1	RJ45	1	Port for RS485 input 1

2.2.9 FAN

The FAN is a fan unit for the BBU3910. There are two fan unit types for the BBU3910: FAN and FANc.

Panel

Figure 2-11 shows the FAN panel.

Figure 2-11 FAN panel

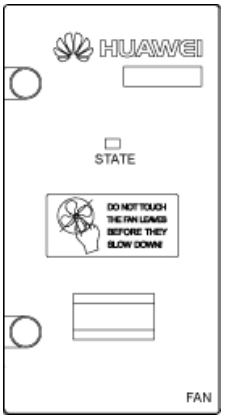
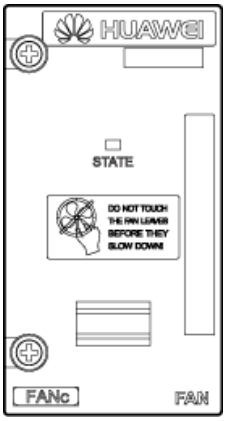


Figure 2-12 shows the FANc panel.

Figure 2-12 FANc panel



Functions

The FAN controls the rotation speed of the fans and monitors the temperature of the fan module. The FAN reports the status of the fans and the fan module to the BBU and dissipates heat from the BBU.

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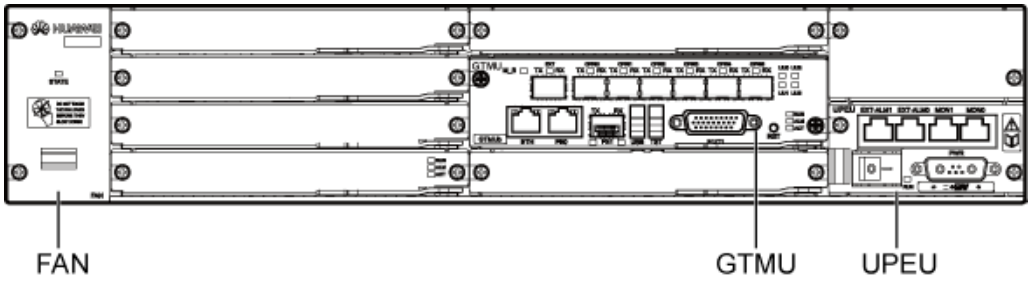
2.2.10 Board Configuration

Figure 2-13 show the typical board configuration for a BBU3910 working in GSM mode, respectively.

Figure 2-13 Typical board configuration for a BBU3910 working in GSM mode



2.3 RRU3004

The RRU3004 performs the following main functions:

- Modulation and demodulation between baseband signals and RF signals
- Data processing
- Signal combining and dividing

Each RRU3004 module supports up to two carriers. The modular design enables operators to flexibly combine different modules according to the actual capacity and coverage requirements. Quick capacity expansion can be achieved by cascading the RRUs onto a single BBU CPRI port.

2.3.1 Appearance of the RRU3004

The RRU3004, a remote radio unit designed on the basis of double-transceiver technology, is used mainly for small or medium-capacity sites. Figure 2-14 shows the appearance of the RRU3004.

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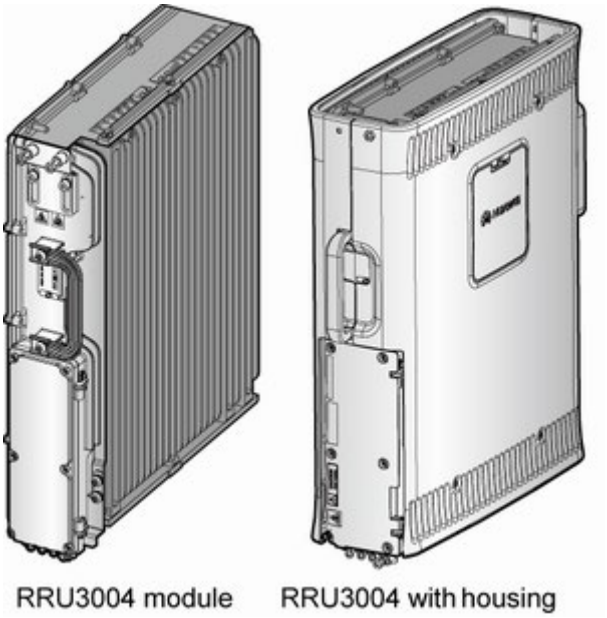
Figure 2-14 Appearance of the RRU3004



2.3.2 Ports on the RRU3004

Table 2-8 describes the ports on the RRU3004.

Table 2-8 Ports on the RRU3004

Port	Specification
ANT_TX/RXA	Antenna ports for connection with the antenna system
ANT_TX/RXB	
EXT_ALM	Alarm port
RET	Port for the Remote Electrical Tilt (RET) antenna
TX RX CPRI_E	Eastward optical/electrical port
TX RX CPRI_W	Westward optical/electrical port

Table 2-9 describes the buttons and wiring terminals of the RRU3004.

Table 2-9 Buttons and wiring terminals of the RRU3004

Silkscreen on the Panel	Description
RST	Button for resetting the RRU3004
TST VSWR	Button for starting a VSWR test

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TST CPRI	Button for the CPRI port test
RTN+	Power supply wiring terminals
NEG-	

2.4 System configuration

The DBS3900 configuration is by nature extremely flexible, since RRUs may be added or subtracted depending on a given site's coverage and capacity requirements. The engineering limits that must not be exceeded are listed in the table:

Configurable item	Engineering limit
Number of active CPRI per BBU	Between 1 and 6
Number of RRU cascaded per CPRI port	Up to 6
Maximum BBU-RRU distance	Up to 40 km
Maximum RRU-RRU distance	Up to 40 km
Maximum number of location groups of Multi-Site Cell	12
Maximum number of RRUs per location group	6

2.5 Networking Capability

The DBS3900 has the following benefits in terms of networking capability:

- Supports multiple transmission modes such as E1, T1, and STM-1 transmission.
- Supports multiple Abis topologies such as star, tree, chain, ring, and hybrid topologies.
- Supports automatic fast switching to the backup route in ring topologies, without any interruption of ongoing services.

2.6 Auxiliary Devices

2.6.1 APM30H

The APM30H provides –48 V DC power for the distributed BTS. In addition, it provides installation space for the BBU3910 and other user equipment. The APM30H cabinet, whose heat dissipation is based on a heat exchanger and the two fans for inner and outer air

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circulation, can be used in areas with poor air quality. Figure 2-15 shows the internal structure of the APM30H.

Figure 2-15 Internal structure of the APM30H

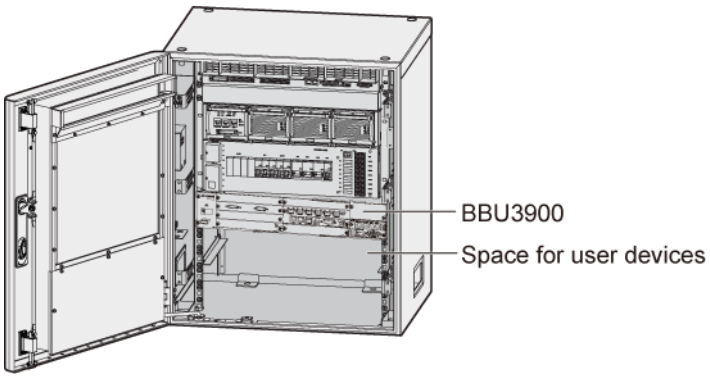

Table 2-10 Technical specifications of the APM30H

Item		Specification
Engineering specifications	Dimensions (height x width x depth)	700 mm × 600 mm × 480 mm (without the base)
	Weight	76.5 kg (without user equipment)
	Working temperature	–40ºC to +50ºC When the ambient temperature is lower than –20°C, an AC heater is required.
	Relative humidity	5% RH to 100% RH
AC input	Input voltage	176 V AC to 290 V AC
	Frequency of input voltage	50 Hz/60 Hz
DC output	Output voltage	–48 V DC
	DC output	20 A: 6 outputs 12 A: 2 outputs 4 A: 2 outputs
Space for user equipment	Without AC heat exchanger	Provides 7 U space for installation
	With AC heat exchanger	Provides 6 U space for installation

2.6.2 RFC5906

The radio frequency cabinet (RFC5906) housing RRUs applies to the DBS3900. The following figure shows the exterior of an RFC5906.

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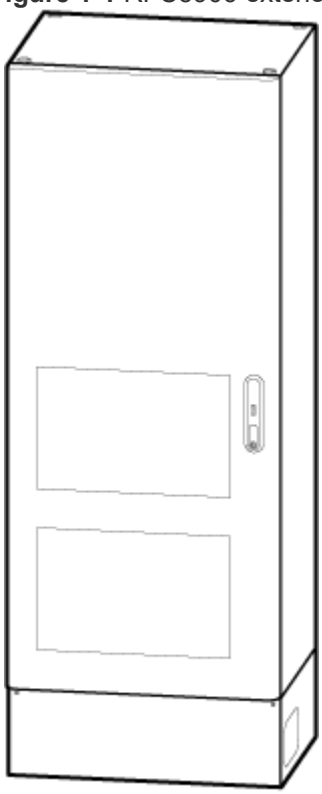
Figure 1-1 RFC5906 exterior



The following figure shows the dimensions of an RFC5906.

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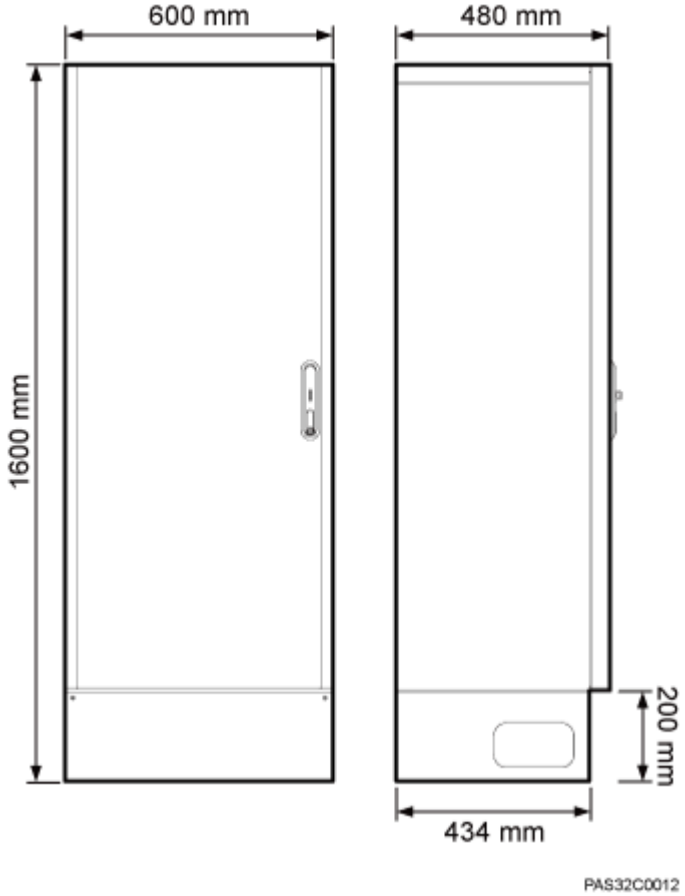
Figure 1-2 Dimensions of an RFC5906



This section describes module and board configurations in an RFC5906. The following figure shows the components in an RFC5906.

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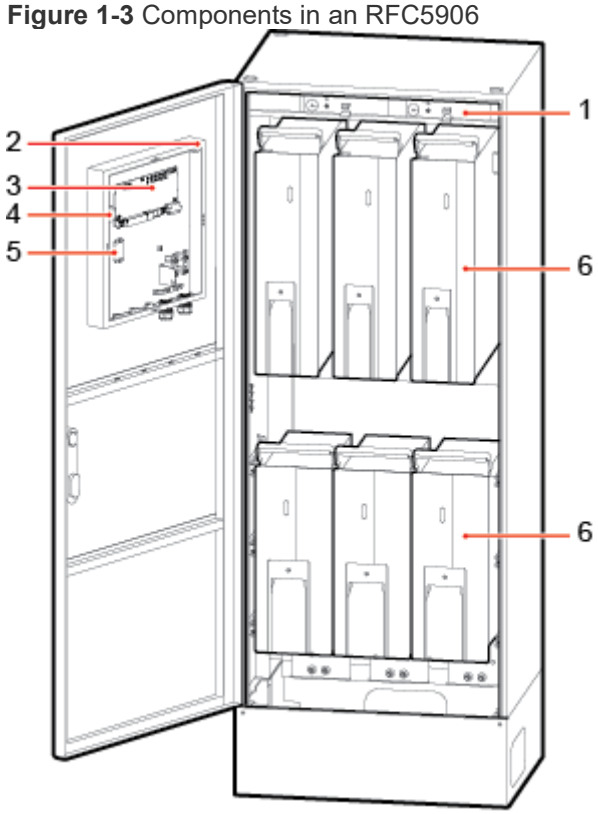
Figure 1-3 Components in an RFC5906



The following table describes the components in an RFC5906.

Table 1-1 Components in an RFC5906

No.	Name	Mandatory/Optional	Maximum Quantity in a Single Cabinet	Description
1	FAN01D-03	Mandatory	2	A FAN01D-03 with a built-in fan is installed in the upper part of the cabinet.
2	Temperature sensor	Mandatory	1	The component is installed on the front door of the cabinet to monitor the temperature in the cabinet.
3	CMUH	Mandatory	1	A central monitoring unit type H (CMUH) controls cabinet temperature, detects Boolean alarms, and identifies an electronic label unit (ELU).
4	ELU	Mandatory	1	The ELU automatically reports the cabinet type, facilitating fault locating.
5	CMUH indicator	Mandatory	1	There are two indicators on the panel of the waterproof box. For details about the status of the indicators.
6	RRU	Optional	6	An RRU is a remote radio unit. It performs the IF processing (Digital I/Q modulation/demodulation, up-/down-conversion, and DA/AD conversion) of the signals, RF processing, and

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No.	Name	Mandatory/Optional	Maximum Quantity in a Single Cabinet	Description
				duplex.

• The following table lists the -48 V DC input power specifications of an RFC5906.

Table 1-2 Input power specifications of an RFC5906

Item	Specifications	Voltage Range
Input power specifications	-48 V DC	-38.4 V DC to -57 V DC

The following table lists the equipment specifications of an RFC5906.

Table 1-3 Equipment specifications of an RFC5906

Item	Specifications
Dimensions (H x W x D)	1600 mm x 600 mm x 480 mm (62.99 in. x 23.62 in. x 18.90 in.)
Weight	Total weight of the cabinet: ≤ 68 kg (149.94 lb)

The following table lists the environmental specifications of an RFC5906.

Table 1-4 Environmental specifications of an RFC5906

Item	Specifications
Operating temperature	-40°C to +50°C (-40°F to +122°F) (1120 W/m2 solar radiation)
Relative humidity	5% RH to 100% RH
Altitude	≤ 4000 m (13123.36 ft)
Ingress protection rating	IP55
Storage environment	ETSI EN 300 019-1-1 Class 1.2 "Weather protected, not temperature-controlled storage locations" Note: • The validity period is one year. • The product can function properly within the validity period if the storage environment meets the preceding standards.
Noise sound power level	Meeting the ETS 300 751 4.1E standard (urban area) • ≤ 6.6 bels@+25°C (77°F) • ≤ 7.6 bels@+45°C (113°F)

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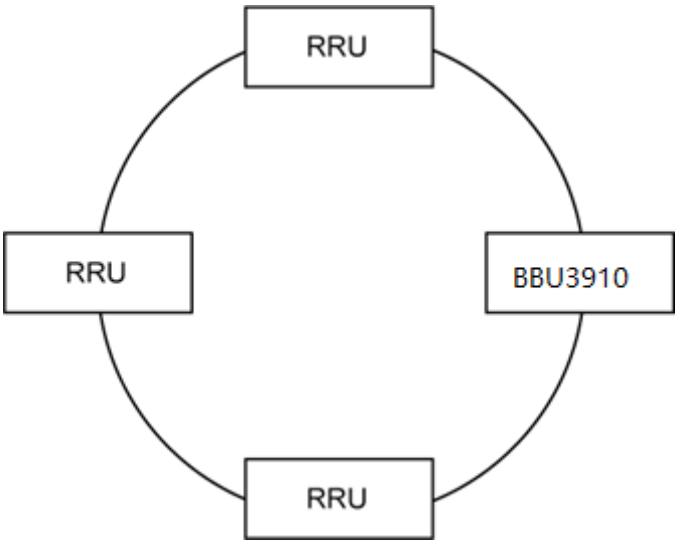
2.7 Reliability

2.7.1 System Reliability

The system reliability of the BBU3910 and RRU is as follows:

- The RRU supports soft reset. In a chain or tree topology, the reset of an upper-level RRU does not affect the lower-level RRU when the reset is caused by reasons other than power-off. These topologies improve system reliability.
- The BBU3910 and RRUs can also form a ring topology. When a unidirectional or bidirectional fault occurs in any node on the ring, the other RRUs are not affected because they support automatic switchover in a ring topology. This also enhances system reliability. Figure 2-16 shows the ring topology of the BBU3910 and RRUs.
- Two BBUs in active/standby mode can ensure protection against BBU failure (BBU redundancy feature).

Figure 2-16 Ring topology of the BBU3910 and RRUs



2.7.2 Hardware Reliability

Hardware Reliability of the BBU3910

The BBU3910 has the following features in terms of hardware reliability:

- The BBU3910 is equipped with built-in fans in N+1 redundancy. The BBU3910 can automatically adjust the fan speed so that the heat dissipation of the system is guaranteed. This helps reduce the noise generated by the fans and minimize fan abrasion, thus improving the lifespan and reliability of the heat dissipation system. In addition, the BBU3910 can control the startup/shutdown of the fan and report alarms in the case of fan failures.
- When one of the fans in the BBU3910 is faulty, the DBS3900 can keep operational if the system temperature is lowered by 10°C.
- The power supply module prevents the BBU3910 from damage caused by overcurrent.
- The BBU3910 supports protection against temperature spikes.

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- The optical modules of the BBU3910 are hot-swappable and easily maintainable.
- The BBU3910 performs environment checks and can report related alarms.
- The power input port on the BBU3910 is capable of preventing incorrect insertion and reverse insertion.

Hardware Reliability of the RRU3004

- Reliability design for power supply

  In DC power input, the RRU can operate within the range from –36 V DC to –57 V DC, which means that the system can keep undamaged even when the peak input voltage reaches –57 V DC.
- Protection against temperature spikes

  When the internal temperature of the RRU is too high due to ambient factors, the system automatically reduces power or shuts down the PA for protection, depending on the severity. When the ambient temperature comes back to normal, the system automatically disables the protection against temperature spikes.

2.7.3 Software Reliability

The DBS3900 software has a very high error tolerance. The whole system does not break down even if the software fails. This means that the system has a self-healing capability. The following describes the error tolerance of the BBU3910 and RRU software.

Regular Check on Key Resources

Seizure checks are conducted on various software resources in the system. If a resource failure occurs due to software faults, the check mechanism can ensure the release of suspended resources and the output of the related logs and alarms.

Parameter Check

Software performs validity checks on all parameters contained in the LMT/OMC commands. The validity of the data in the data configuration file is also checked when the system is started. This ensures normal system operation. When the software is active, any possible fault in the software or hardware is monitored. The detected faults are reported. Task status and system anomalies can also be monitored.

Software Failure Protection

The base station stores two software releases and data releases on its local disk. If a fault occurs during the software upgrade, the system automatically rolls back to the previous version. The rollback function makes it possible to avoid onsite handling of faults caused by software downloading.

Data Check

In terms of data check, the system performs the following functions:

- Checking data consistency on a regular or event-triggered basis
- Restoring data consistency selectively or by preference
- Generating related logs and alarms

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Saving Operation Log Information

The system records user operations on a regular basis and saves the information in operation logs. The operation logs help users locate problems and restore data.

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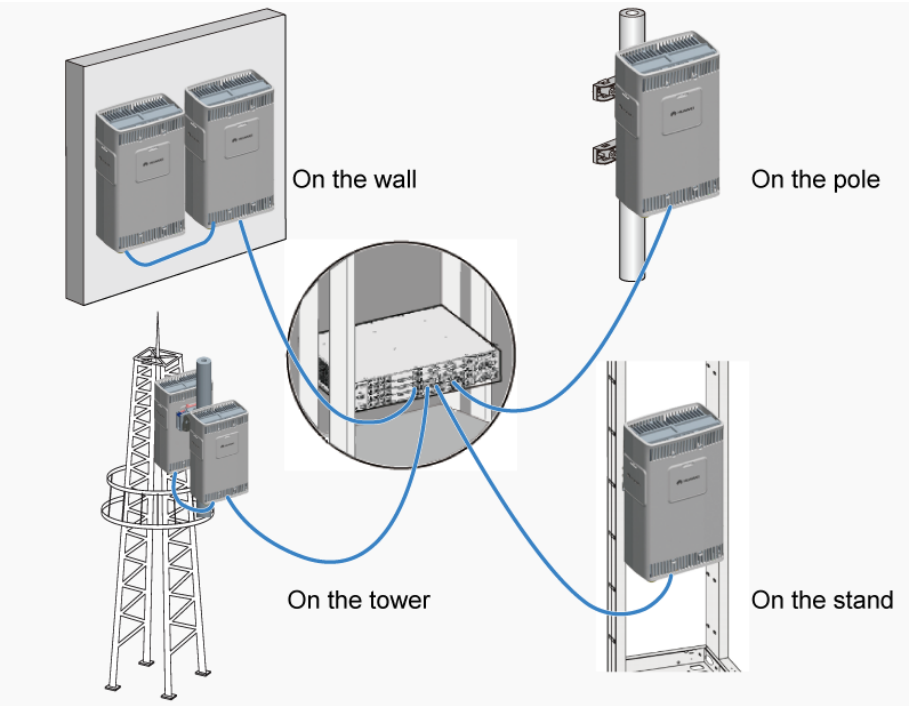
3 Application Scenarios

3.1 Typical Installation Scenarios of the DBS3900

As demand for environmental protection and lease cost has increased, constructing new sites has become increasingly difficult. The DBS3900 developed by Huawei features high integration, easy installation, and low environmental requirements. All these features facilitate site acquisition and co-siting with an existing site. The BBU3910 has a compact case structure that only requires a 19-inch-wide and 2-U-high space. It can be installed on the wall, on a stairs, or in a storeroom. It can also be installed in the outdoor cabinet of an existing network equipment. The RRUs can be mounted on a pole, tower, wall, or stand. The RRU supports up to 6 levels of cascading. One RRU module can be placed at most 40 km away from the BBU3910.

Figure 3-1 shows typical installation scenarios of the DBS3900.

Figure 3-1 Typical installation scenarios of the DBS3900



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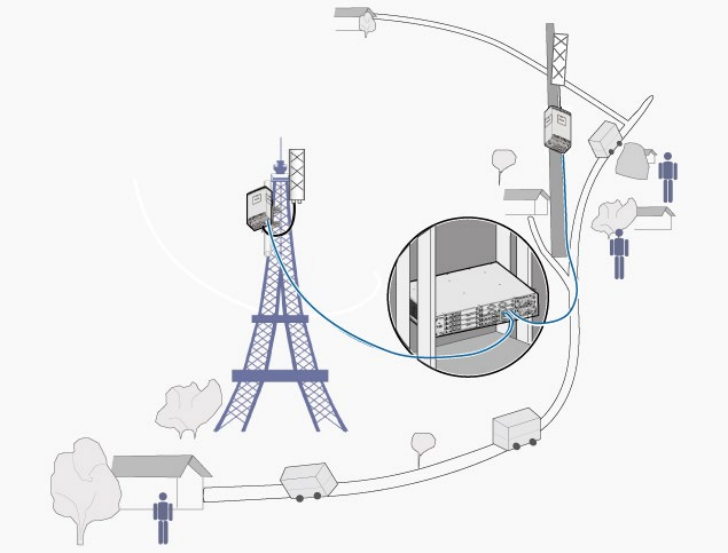
3.2 Applications of the DBS3900

Possessing features such as flexible installation, natural heat dissipation, quiet operation, and quick network construction, the DBS3900 is applicable to scenarios such as indoor coverage and coverage along railways (including large-scale major stations and tunnel coverage).

Coverage Along Railways and Highways

With several RRUs sharing one cell, the DBS3900 helps reduce the number of inter-cell handovers. This improves QoS for users during high-speed movement, which provides an ideal solution to coverage along railways and highways and tunnels. Figure 3-2 shows the typical application scenario of coverage along railways and highways.

Figure 3-2 Coverage along railways and highways



Indoor Coverage in Station Buildings

As to the indoor coverage in buildings, the DBS3900 provides an effective solution with desirable features, typified by a small space and quick site deployment. Figure 3-3 shows the typical application scenario of the coverage in buildings.

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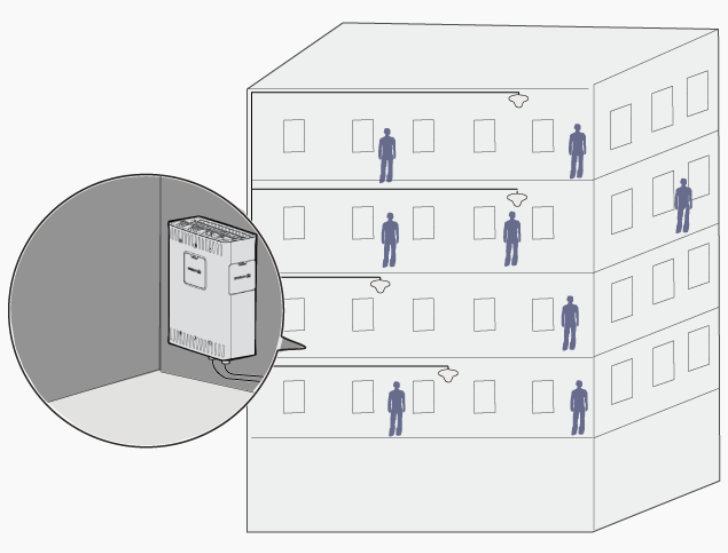
Figure 3-3 Indoor coverage in Station buildings



Coverage Of Tunnels

The advantages of using DBS3900 for tunnel coverage are as follows:

- Reduce the number of handovers by using the Multi-Site Cell feature.
- Avoid the disturbance brought by repeater.
- Share the same NMS with other BTS.

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4 Technical Specification

4.1 Technical Specifications of the DBS3900 GSM

Table 4-1 Technical specifications of the DBS3900 GSM

Item	Specification				
Supported frequency band	Frequency band		RX band (MHz)	TX band (MHz)	
	RRU3004	RGSM 900M	876-880	921-925	
Capacity	RRU3004	Up to 24 carriers per cell; up to 12cells, 72 carriers per site			
Receiver static sensitivity	RRU3004	RX independency	2-way RX diversity		
		–113 dBm	–116 dBm		
Output power (TOC, Top-of-Cabinet)	RRU3004	900 MHz (GMSK/8PSK) • With no internal combination: 30 W/20 W • With internal combination: 15 W/10 W • With PBT: 40 W/25 W			
Transmission port	4 E1s/T1s				
Dimensions	Item		Height (mm)	Width (mm)	Depth (mm)
	BBU3910		86	442	310
	RRU3004		480	356	100
	RRU3004 (with housing)		485	380	130
Weight	BBU3910	7 kg (typical); 12 kg (maximum)			
	RRU3004	15 kg (without housing); 17 kg (with housing)			
Input power	BBU3910	• –48 V DC, voltage range: –38.4 V DC to –57 V DC • +24 V DC, voltage range: +21.6 V DC to +29 V DC			
	RRU3004	• –48 V DC, voltage range: –36 V DC to –57 V DC			

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Item	Specification
Temperature	• BBU3910: –20°C to +55°C • RRU3004 (without solar radiation): –40°C to +55°C • RRU3004 (with solar radiation): –40°C to +45°C
Relative humidity	BBU3910: 5% RH to 95% RH
	RRU3004: 5% RH to 100% RH
Air pressure	70 kPa to 106 kPa
Protection degree	BBU3910: IP20 RRU3004: IP65
Anti-seismic performance	BBU3910: IEC 60068-2-57 (1999-11) RRU3004: NEBS GR63 zone4
RET antenna	In compliance with the AISG2.0 protocol
Storage environment	ETSI EN 300019-1-1 V2.1.4 (2003-04) Class 1.2: "Weather protected, not temperature-controlled storage locations"
Transportation environment	ETSI EN 300019-1-2 V2.1.4 (2003-04) Class 2.3: "Public transportation"
Operating environment	BBU3910 in compliance with: ETSI EN 300019-1-3 V2.2.2 (2004-07) Class 3.1: "Temperature-controlled locations"
	RRU in compliance with: • 3G TS25.141 V3.0.0 • ETSI EN 300019-1-4 V2.1.2 (2003-04) Class 4.1: "Non-weather protected locations"
RF specification	3GPP TS 45.005 V8.2.0 multicarrier BTS class 2 requirement
EMC	The DBS3900 meets the EMC requirements and complies with the following standards: • R&TTE Directive 99/5/EC • 3GPP TS 25.113 V4.4.0 (2002-12) • ETSI EN 301 489-1 V1.5.1 (2004-11) • ETSI EN 301 908-1 V2.2.1 (2003-10) • ITU-T SM 329-10(2003) • FCC PART15 • CENELEC EN 50121-4

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5 Abbreviations

Abbreviation	Full Name
APM	Advanced Power Module
BBC	Battery Backup Cabinet
BBU	BaseBand Unit
CAPEX	CAPital Expenditure
CPRI	Common Public Radio Interface
GTMU	GSM Transmission & Timing & Management Unit for BBU
LTE	Long Term Evolution
OPEX	Operation Expenditure
RRU	Radio Remote Unit
TMC	Transmission Cabinet
TOC	Transmit Power at the Top Of Cabinet
UBFA	Universal BBU Fan unit type A
UEIU	Universal Environment Interface Unit
UELP	Universal E1/T1 Lightning Protection unit
UPEU	Universal Power and Environment interface Unit

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